MEDDAC/DENTAC Regulation 40-21

Medical Services

Tuberculosis Exposure Control Plan (TBECP)

Headquarters
U.S. Army Medical Department Activity
Fort George G. Meade
2480 Llewellyn Avenue
Fort George G. Meade, MD 20755-5800
28 January 2003

Unclassified

SUMMARY of CHANGE

MEDDAC/DENTAC REG 40-21
Tuberculosis Exposure Control Plan (TBECP)

Specifically, this revision—

- Has been published in a new format that includes a cover and this "Summary of Change" page.

- Reformats the title page. The Contents section now includes the page numbers that the various chapters and paragraphs begin on.

- Changes birthmonth annual training to Computer-based Annual Training throughout the regulation.

- Changes the requirement for the Community Health Nurse to conduct an Isoniazid (IHN) Clinic to conduct a TB clinic (para 2-8).

- Deletes para 2-9i.

- In para 2-12c, changes OSHA 200 Log to OSHA 300 Log.

- Changes the requirement for contract, volunteer, and student training program directors to provide the contract officer representative with compliance documentation whenever employees receive initial and annual TB skin tests and evaluations, instead of providing this documentation to the Infection Control Practitioner (para 2-16).

- Deletes para 2-16f and redesignates old paragraphs 2-16g through 2-16i to 2-16f through 2-16h.

- Changes paragraph 3-5 as follows:

  - Adds new paragraph 3-5a, which states that employees who have negative TB skin tests and work in patient care areas will obtain annual TB skin tests, and that employees with positive TB skin tests will receive a TB risk assessment during their annual OH record reviews.
  - Adds new paragraph 3-5b, which states that employees with previously known positive Purified Protein Derivative (PPD) reactions will be exempt from repeat skin tests, and that chest x-rays are required initially and will be repeated only if symptomatic for TB.
  - Redesignates old paragraphs 3-5a through 3-5f to 3-5c through 3-5h.

- Changes After Hours Clinic to OHESS Satellite Clinic (para 4-5).

- Deletes paragraph 4-5i and redesignates old paragraphs 4-5j and to 4-5-k to 4-5i and 4-5j.

- Changes paragraph 5-5c by deleting everything after PPD so that it reads, “Ensure there is documentation of a negative chest x-ray after documented positive PPD.”

- Changes paragraph 5-5e to read, “During birth month, employees who have a documented history of a positive PPD test will be screened by OH for signs or symptoms suggestive of TB, and documented in OH records.”

- Changes paragraph 5-6a(2) to read, “Order chest x-rays and evaluate personnel who exhibit a significant reaction to the Mantoux test to determine the presence of current TB disease and/ or tuberculin derived antigens.”

- Makes other small corrections throughout the regulation.

Department of the Army
Headquarters
United States Army Medical Department Activity
2480 Llewellyn Avenue
Fort George G. Meade, Maryland 20755-5800
28 January 2003

*** MEDDAC/DENTAC Regulation 40-21**

Medical Services

Tuberculosis Exposure Control Plan (TBECP)

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History. This is the second revision of this publication, which was originally published on 1 December 1997.

Summary. This regulation establishes policies and procedures to minimize the transmission of tuberculosis within the medical treatment facilities (MTFs) of the U.S. Army Medical Department Activity, Fort George G. Meade (MEDDAC) and the dental treatment facilities of the U.S. Army Dental Activity, Fort George G. Meade (DENTAC).

Applicability. This regulation applies to the MEDDAC headquarters, all outlying clinics, and DENTAC.

Proponent. The proponent of this regulation is the Safety/Infection Control Officer.

Supplementation. Supplementation of this regulation is prohibited.

Suggested improvements. Users of this publication are invited to send comments and suggested improvements, by memorandum, directly to the Commander, U.S. Army Medical Department Activity, ATTN: MCXR-SA, Fort George G. Meade, MD 20755-5800, or to the MEDDAC's Command Editor by fax to (301) 677-8088 or e-mail to john.schneider@na.amedd.army.mil.

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* This publication supersedes MEDDAC/DENTAC Reg 40-21, dated 25 September 2001.

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Glossary

Chapter I
Introduction

1-1. Purpose
This regulation establishes responsibilities, policies and procedures for implementation of a TBECP. The TBECP details measures to achieve early detection, isolation, and treatment of persons with active tuberculosis (TB), in order to minimize the risk of transmission of TB to healthcare workers, patients, volunteers, visitors, and other persons in the health-care setting and the community. The TBECP details measures the Fort Meade MEDDAC and DENTAC and their employees will take to decrease the risk of transmission of TB. The TBECP also details the appropriate counseling and treatment should an employee become infected by TB.

1-2. References
Related publications are listed in appendix A.

1-3. Explanation of abbreviations and terms
Abbreviations and special terms used in this regulation are explained in the glossary.

Chapter 2
Responsibilities

2-1. The MEDDAC Commander
The MEDDAC commander will ensure that the MEDDAC develops and implements a TBECP.

2-2. Commanders, directors and managers of the MEDDAC's outlying clinics, and dental clinics
Commanders, directors and managers of outlying clinics; that is, U.S. Army health clinics and separate environmental health (EH), industrial hygiene (IH), and occupational health (OH) clinics, and dental clinics will—

a. Implement and ensure compliance with this regulation.

b. Develop a standing operating procedure (SOP) with clinic-specific policies to meet Occupational Safety and Health Administration (OSHA) and state and local government requirements(specific responsibilities, clinic risk assessment, employees at risk for exposure, engineering controls available, and the respiratory protection program) and provide a copy to the MEDDAC ICP to present to the Infection Control Committee for approval.

2-3. The Chief, Preventive Medicine Service (PM)
The Chief, PM will assist the ICP in the annual review and revision of the TBECP.

2-4. Department chiefs
Department chiefs will—

a. Ensure all employees participate in initial and annual TB training.

b. Ensure prospective employees are oriented to possible risk of TB exposure prior to employment.

c. Ensure that administrative controls are used to limit the number of employees who will potentially be exposed to TB.

d. Ensure that personal protective equipment (PPE) and engineering controls are available at no cost to the employee, as appropriate.

e. Ensure at-risk MEDDAC employees are enrolled in the respiratory protection program, as identified in appendix B, are issued an approved TB respiratory protection device (RPD) or are educated on the location of the powered air filtration respirator (PAPR); and will follow the guidelines delineated in the Respiratory Protection Program.

f. Ensure employees use RPD when entering the negative pressure room with suspected or confirmed TB patients.

g. Ensure that TB RPDs are accessible, maintained in good condition, and replaced when no longer serviceable.

h. Ensure that appropriate isolation procedures are followed when TB is suspected.

i. Ensure that a copy of this regulation is available to department personnel at all times.

j. Ensure that compliance with this regulation is monitored and evidence of results and actions taken to correct problems are maintained.

k. Ensure that employees are supervised in the protective practices, evaluated on the need for further training; and remedial action is taken as needed.

l. Report active cases of employee TB immediately to the Community Health Nursing (CHN), OH and the Infection Control Practitioner.

m. Notify the MEDDAC Infection Control Practitioner, CHN and OH of suspected or confirmed cases of TB in the ambulatory setting.

n. Ensure all departmental personnel receive initial and periodic TB screenings.

o. Ensure that all employees returning to work after being treated for active TB report to OH for clearance prior to returning to work.

p. Develop, implement and enforce procedures for the early detection of patients who may have infectious TB in accordance with (IAW) this regulation.

q. Ensure that department policies and procedures support compliance with this TBECP.

r. Ensure compliance with TB testing and TB training requirements by students and reservists is monitored and ensured.

2-5. The Chief, Patient Administration Division

The Chief, Patient Administration Division will—

a. Ensure military health records are maintained IAW 40-66.

b. Provide copies of the results of the examinations, medical testing and follow up procedures that took place as a result of an employee's exposure to the TB pathogen to the to the employee upon request.

c. Provide a copy of the information resulting from exposure to the TB pathogen to consulting health care professionals upon request.

d. Keep the information in medical records confidential. Information will not be disclosed to anyone without the employee's written consent, except as authorized by law or regulation.

2-6. The Chief, Plans, Training, Mobilization and Security Division (PTM&S)

The Chief, PTM&S will —

a. Ensure that all MEDDAC reservists conform to TBECP requirements as appropriate.

b. Maintain a record of employees who complete the online Computer-based Annual Training (CBAT).

2-7. The Infection Control Committee

The Infection Control Committee has the overall responsibility for the TB Infection Control Program.

2-8. The Community Health Nurse or medical treatment facility (MTF) designee

The Community Health Nurse or MTF designee will—

a. Conduct epidemiologic investigation of active cases of TB with assistance from OH, the Infection Control Practitioner and the county health department, as appropriate.

b. Maintain a TB registry.

c. Conduct a TB clinic.

d. Report active TB cases as required by Army, state, and federal regulations.

2-9. The Infection Control Practitioner (ICP)

The ICP will—

a. Monitor implementation of TB control procedures.

b. Ensure that initial and annual training for all employees is provided to meet the standards of this regulation.

c. Provide advice and consultation on TB policies and procedures; provide assistance with equipment, practice and education to all departments.

d. Monitor Federal TB policies; ensure that this regulation and TB infection control policies are updated annually or more frequently as needed.

e. Ensure that employee and patient TB cases are reported to OH, CHN and PM.

f. Perform annual TB risk assessments.

g. Investigate transportation methods for all patients with suspected or confirmed TB; to include notification of proper authorities when patients are transported by ambulance.

h. Participate in contact investigations as needed.

2-10. The Chief, OH

The Chief, OH will—

a. Provide TB testing for MEDDAC and DENTAC active duty personnel and Federal civilian employees at time of inprocessing and as specified in this regulation, as applicable.

b. Refer active duty military personnel, military retirees and family members with positive TB skin tests to CHN; all federal civilian employees (who are not military retirees or family members) with positive TB skin tests may be referred to the Public Health Chest Clinic in the county in which they live.

c. Provide medical evaluation and clearance for personnel who are required to wear RPD.

d. Maintain a database of TB skin test results for active duty and Federal civilian employees.

e. Provide department chiefs with a list of personnel who are non-compliant with required TB testing.

f. Ensure that employees with TB infection are referred to CHN for appropriate management. Review documentation of care when civilian employees obtain care through private physicians. (Ensure that employees returning to work after being treated for active TB are cleared prior to reporting to work.)

g. Assist in contact investigations for employee exposures to active TB.

h. Conduct co-worker contact evaluation when an employee is identified with active TB.

i. Ensure that civilian health records are maintained IAW AR 40-66.

2-11. The Chief, IH

The Chief, IH will—

a. Assist the MEDDAC Safety Officer to administer the Respiratory Protection Program, to include fit testing, training, and annual program evaluation.

b. Provide guidance on the selection and use of respirators.

c. Perform ventilation surveys to determine operating status of negative pressure areas, as applicable.

d. Provide consultation to appropriate MEDDAC MTF facilities engineers upon request.

e. Perform periodic ventilation and walk thru surveys to determine the operating status of the general heating ventilation air conditioning system (HVAC), negative pressure areas and any other local exhaust ventilation systems used for control of infectious airborne droplet nuclei.

f. Conduct respiratory fit testing on employees IAW the MEDDAC's Respiratory Protection Program.

2-12. The Safety Officer

The Safety Officer will—

a. Administer the Respiratory Protection Program, to include fit testing, training, records maintenance and annual program evaluation.

b. Ensure an adequate stock level of respirators is maintained.

c. Maintain and monitor the Federal Log of Occupational Injury and Illnesses (OSHA 300 Log).

d. Investigate circumstances in which employees decline to use personal protective equipment (PPE).

e. Monitor compliance with this regulation through the MEDDAC Safety Committee and Environment of Care Committee/Infection Control Committee (as appropriate) and during routine safety inspections.

2-13. The Chief, Resource Management Branch

The Chief, Resource Management Branch will ensure that all civilian training programs with which the MEDDAC has a memorandum of agreement and in which students will have potential occupational exposure to TB, as defined in this regulation, are provided with a copy of this regulation and requested to comply with all its provisions to include TB skin testing, TB training, TB exposure incident follow up and records maintenance.

2-14. The Chief, Managed Care Branch

The Chief, Managed Care Branch will—

a. Ensure compliance by the contractor with this regulation.

b. Ensure that contracts for personnel identified as having potential occupational exposure to TB contain the requirement to comply with all provisions of this regulation, including TB skin testing, TB training, TB exposure incident follow up, records maintenance and TBECP. Ensure that contracts contain a provision that contractors will report the name of any employee to the contract officer representative (COR) who has a positive PPD conversion or case of active TB while at one of the MEDDAC's MTF or a dental clinic within three months after departure.

2-15. Providers

Providers will—

a. Ensure strict compliance with TB precautions.

b. Provide initial medical evaluation of suspected active TB cases, or ensure that such is accomplished, and transfer patients to collaborating facility for definitive diagnosis and treatment.

c. Ensure that all patients considered for prophylaxis are referred to CHN.

d. Ensure all active cases of TB are referred to CHN, or the MTF designee.

e. Ensure all active cases of employees with TB have been referred to OH.

f. Ensure all active cases of contract employees have been referred to the appropriate MTF contract representative.

2-16. Contract, volunteer, and student training program directors

Contract, volunteer, and student training program directors will—

a. Conform to all provisions of this TBECP.

b. Provide pre-placement TB skin testing, using the two step method, if indicated, prior to working at a MEDDAC MTF or a dental facility. Provide TB skin testing after a TB exposure incident, unless there is a documented negative TB skin test within the past three months. If the result is negative, provide another skin test three months later. Provide the COR with a copy of the testing results, prior to employee working. Contract personnel information will be provided through the appropriate COR.

c. Provide annual TB skin testing and evaluation, as appropriate. Provide the COR with compliance documentation to include conversion status.

d. Provide a medical evaluation for respirator wear and provide for personnel who require a TB respirator IAW this regulation.

e. Maintain training records for contract, volunteer, and student training personnel.

f. CORs will maintain record of compliance with pre-employment and annual TB skin testing. Provide requirement summary of documentation of compliance to the ICP annually, for inclusion in the Infection Control Committee minutes. Additionally, CORs will track compliance of contract employees with routine initial and annual training requirements as delineated in this regulation.

g. Provide access by designated MEDDAC representatives to immunization and training records as required in the performance of their duties.

h. Ensure employees who require respiratory fit testing comply with the guidelines of the Respiratory Protection Program.

2-17. Supervisors

Supervisors will ensure that male employees who are required to wear respiratory protection are clean shaven, if required.

2-18. The Chief, Medical Maintenance Branch

The Chief, Medical Maintenance Branch will be responsible for maintenance on the portable high efficiency particulate air (HEPA) filter systems.

2-19. The Chief, Facilities Management Branch

The Chief, Facilities Management Branch will ensure general mechanical ventilation is operated IAW applicable regulations.

2-20. The Noncommissioned Officer in Charge (NCOIC), Respiratory Therapy

The NCOIC, Respiratory Therapy will provide pulmonary function testing as part of clearance for the Respiratory Protection Program.

2-21. The staff

The staff; that is, military staff and civilian staff, will—

a. Comply with all applicable portions of this regulation.

b. Participate in the Tuberculosis Skin Testing Program at initial employment and annually as required during birth month.

c. Know tasks they perform that have potential for occupational exposure to TB.

d. Attend orientation and TB training provided within the CBAT module, as required in chapter 5, below.

e. Conduct all procedures IAW good work practice controls.

f. Follow the guidelines established in the Respiratory Protection Program.

g. Wear and maintain the TB respirator when required IAW the Respiratory Protection Program enrollment and guidelines.

h. Know the location of the respiratory protection devices (PAPR/N-95 mask) and patient masks, as appropriate.

i Report signs or symptoms of TB to OH.

j. Undergo an evaluation to rule out active TB if PPD testing indicates a possible infection.

k. Receive treatment for active TB and follow OH guidelines for returning to work.

l. Participate in contact investigation if suspected to be linked to active TB case.

m. Advise OH of any immunosuppressive conditions that would increase the risk of developing active disease if the employee is infected with TB.

n. Notify the Chief, Managed Care Branch, Business Division, of any variance from this TBECP by contract personnel.

Chapter 3
General, TB Control Objectives, TBECP Risk Assessment, Engineering Controls, and MEDDAC Policy

3-1. General

Tuberculosis is an airborne communicable disease caused by Mycobacterium tuberculosis (MTB) which is spread by tiny airborne particles (droplet nuclei) expelled by a person who has infectious TB. Transmission of MTB is a recognized risk to patients and staff in healthcare facilities. In October 1993, the U.S. Department of Labor, in the face of the increased hazards posed by TB, including drug-resistant strains of the disease, issued enforcement guidance to protect healthcare facility staff against exposures to the bacteria. Guidance is based principally on the October 1994 guidelines for preventing the transmission of TB in the health care settings issued by the Centers for Disease Control and Prevention (CDC), subsequent CDC guidelines on the treatment of latent tuberculosis and the OSHA standard for TB respiratory protection. This regulation meets OSHA standards and CDC guidelines for promoting a safer workplace with decreased risk to patients, visitors and healthcare facility staff.

3-2. Control objectives

The CDC Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Facilities, 1994, sets forth guidelines on TB infection control, with emphasis on achieving the goals of early identification, isolation, and treatment of active TB through the application of a hierarchy of control measures. The *Core Curriculum on Tuberculosis, Fourth Edition, 2000*, also details infection control in the health care setting.

a. The first level of the hierarchy is implementation of administrative measures to reduce the risk for exposing uninfected persons to persons who have infectious TB. These measures include—

(1) Developing and implementing effective written policies and protocols to ensure rapid identification, isolation, diagnostic evaluation, and treatment of persons likely to have TB.

(2) Implementing effective work practices among health care workers (HCWs), such as wearing respiratory protection correctly and keeping doors to isolation rooms closed.

(3) Educating, training, and counseling HCWs about TB.

(4) Screening HCWs for TB infection and disease.

b. The second level of the hierarchy is the use of engineering controls to prevent the spread and reduce the concentration of infectious droplet nuclei. These controls include—

(1) Direct source control using local exhaust ventilation.

(2) Controlling direction of airflow to prevent contamination of air in areas adjacent to the infectious source.

(3) Diluting and removing contaminated air via general ventilation.

c. The third level of the hierarchy is the use of personal respiratory protective equipment when entering areas where exposure to TB can still occur; that is, rooms of patients with known or suspected infectious TB. (The first two levels reduce the risk of exposure to TB but do not eliminate it.)

3-3. TBECP, risk assessment

a. Risk assessment. Tuberculosis infection control measures should be based on the assessment of the risk for TB transmission in a particular setting.

(1) The protocol for conducting risk assessments is in appendix C. Based on the risk assessment, the facility, area or occupational group is classified as high, intermediate, low, very low, or minimal risk as defined in appendix D. The frequency of repeat risk assessments will be determined using the CDC recommendations contained in appendix F.

(2) The risk assessment will be conducted by the IC service in collaboration with OH and CHN at least annually.

b. The TBECP, based on TB risk, will be reviewed and updated annually by PM and ICP and will be presented to the Infection Control Committee for approval.

c. The results of the TB risk assessments will be published in the Infection Control Committee minutes.

d. After each risk assessment, the members of the Infection Control Committee, CHN, PM and OH will review the TBECP to ensure that it is still effective and current.

3-4. KACC engineering controls

A portable IsoClean self-contained HEPA filtration system, vented to the outside to create negative pressure, is located in the KACC negative isolation room and will be used for temporary respiratory isolation in the ambulatory care setting while diagnostic evaluation is being conducted.

3-5. MEDDAC policy

MEDDAC MTFs are classified as Minimal or Very Low Risk for the transmission of TB. Based on risk, the following policies on the management of potential TB patients will be adhered to by the staff.

a. Employees who have negative TB skin tests and work in patient care areas will obtain annual TB skin tests. Employees with positive TB skin tests will receive a TB risk assessment during their annual OH record reviews.

b. Employees with previously known positive Purified Protein Derivative (PPD) reactions will be exempt from repeat skin tests. Chest x-rays are required initially and will be repeated only if symptomatic for TB.

c. All patients with suspected or confirmed active TB will be referred to a collaborating inpatient MTF if inpatient care is required.

d. Patients with a significant suspicion of having active TB will be transferred to a collaborating inpatient MTF for cough-inducing procedure.

e. Patients who may have or are suspected to have infectious TB should wear surgical masks that cover the mouth and nose during transport.

f. Procedures will not be performed on patients with suspected or confirmed active TB.

g. All patients with known or suspected active TB will be educated to use a surgical mask before entering the MTF.

h. All cases of known or suspected active TB will be referred to the appropriate preventive medicine and public health representatives.

Chapter 4
Patient Care Practice

Section I
Identifying Patients Who May Have Active TB, Diagnosing TB, and Treatment of Patients with Suspected or Confirmed TB

4-1. Identifying patients who may have active TB

a. The early identification of patients who may have infectious TB is an important factor in preventing the nosocomial transmission of *M. tuberculosis* in health care facilities. A high index of suspicion and immediate steps to prevent transmission through appropriate airborne isolation and initiation of treatment are imperative in all settings.

b. Healthcare personnel who are assigned responsibility for TB infection control will develop, implement and enforce protocols for the early identification of patients who may have infectious TB. Regulation protocols require that all healthcare providers be alert for the possibility of TB in their patient populations.

c. The *Core Curriculum on Tuberculosis, Fourth Edition, 2000* identifies two high risk groups that should be tested for TB:

(1) Persons at high risk for exposure or infection.

(2) Persons at higher risk for TB disease once infected. (See appendix F.)

d. Persons at increased risk for TB, as defined in appendix D, including human immuno-deficiency virus (HIV) infection or risk factors for HIV infection, will be screened for TB infection with a Mantoux PPD TB skin test.

e. TB will always be included in the differential diagnosis in patients with the following signs or symptoms:

(1) Productive, prolonged cough, duration $\geq$ 3 weeks.

(2) Bloody sputum.

(3) Night sweats.

(4) Unexplained weight loss.

(5) Anorexia.

(6) Fever.

(7) Pulmonary signs or symptoms initially ascribed to other etiologies. Evaluation for co-existing TB should be repeated if the patient does not respond to appropriate therapy for the presumed diagnosis.

4-2. Diagnosing TB

a. Diagnostic measures for identifying TB will be conducted for patients who are suspected of having active TB. These measures include—

(1) Obtaining a medical history.

(2) Performing a physical examination.

(3) Administering and reading a PPD skin test.

(4) Obtaining chest x-ray.

(5) Microscopic examination for acid-fast bacilli and culture of sputum or other appropriate specimens.

b. Smear and culture examination of at least three sputum specimens, collected on three different days, is the main diagnostic procedure for pulmonary TB.

c. Sputum smears that fail to demonstrate acid-fast bacilli do not exclude the diagnosis of TB since smear examination permits only the presumptive diagnosis of TB. Many TB patients have negative TB smears.

d. Other diagnostic procedures (such as bronchoscopy or biopsy) may be indicated for some patients.

4-3. Treatment of patients with suspected or confirmed TB

a. Patients who have confirmed active TB or who are considered highly likely to have active TB should be started promptly on treatment.

b. Directly observed therapy (DOT) as an outpatient is strongly encouraged. This decision, and arrangements for providing DOT, should be made IAW guidance from the Pennsylvania Department of Health or Maryland Department of Health and Mental Hygiene, in collaboration with the Community Health Nurse, or MTF designee.

Section II
Management of Patients in Ambulatory Care Settings

4-4. Triage of patients at first point of contact to detect potentially active TB patients

a. Triage of patients will include vigorous efforts to promptly identify patients with active TB. Healthcare workers who are the first points of contact will be trained by a healthcare provider knowledgeable in TB to ask questions that will facilitate identification of patients with signs and symptoms suggestive of TB.

b. Patients with signs or symptoms suggestive of TB will immediately be placed on TB precautions and then promptly isolated (in a negative pressure isolation room if available). The following TB precautions will be initiated prior to and during the transfer of a patient to the negative pressure isolation room:

(1) The patient shall be given a surgical mask to wear and instructed to keep it on.

(2) The patient shall be given tissues and instructed to cover his or her mouth and nose when coughing or sneezing, if the mask must be removed to facilitate respiratory clearance.

(3) The patient shall be removed from the general waiting area to a designated clinic isolation room.

c. TB precautions for known TB patients noncompliant with prescribed drug therapy will be instituted immediately.

d. When a known or suspected TB patient is to be transferred, the ambulance dispatcher and the receiving hospital will be notified by phone prior to transport to use TB precautions. The patient will be transferred wearing a surgical mask.

e. Active TB patients will not be scheduled at the same site and time with immunocompromised and HIV patients. If this is not feasible, they should be physically separated in clinic or waiting areas.

4-5. Ambulatory care isolation practice for patients with suspected or confirmed TB

a. Airborne precaution isolation (API) (monitored negative pressure, 6 to 12 air changes per hour) will prevent the escape of droplet nuclei from the room, preventing entry of the MTB into the hall and other areas.

b. The designated KACC API room is in the OHESS Satellite Clinic.

c. Patients in isolation shall be educated about TB transmission and the reasons for isolation. They shall be taught to cover their mouths and noses with a tissue when coughing or sneezing; even while in the isolation room, in order to contain liquid drops and droplets before they are expelled into the air.

d. A sign will be posted on the door outside of the isolation room stating, "STOP. Report to Nurses Station before entering." The staff will specify the precautions that must be taken to interact with that patient; for example, use of a TB respirator by staff entering the room.

e. Patients in TB isolation shall remain in isolation with the door closed.

f. The number of persons entering the TB isolation room shall be minimized and all staff who enter negative pressure isolation must wear approved TB respirators.

g. Transporting the TB patient outside the isolation room shall occur only when medically essential procedures cannot be performed in the isolation room; for example, for an x-ray.

h. A surgical mask shall be worn by the patient when outside the isolation room. The staff member transporting the patient is not required to wear a mask. Transport shall be planned to ensure that the patient does not have to wait in a crowed area, such as the Radiology waiting room.

i. The ICP and CHN shall be notified telephonically of the impending transport to another MTF of any patient who is suspected or known to have active TB.

j. When ambulance personnel or others must transport patients with confirmed or suspected active TB—

(1) A surgical mask shall be placed over the patient's nose and mouth, if possible.

(2) Ambulance personnel will wear respiratory protection when transporting such patients, since administrative and engineering controls during emergency transport situations cannot be

ensured.

(3) The vehicle's windows should be kept open, if feasible.

(4) The vehicle's heating or air conditioning system should be set on a nonrecirculating cycle.

4-6. Discharge of infectious TB patients from the ambulatory care setting

a. Infectious patients shall be discharged only to MTFs with TB isolation capability or to home. If high risk persons reside in the home with the patient, either they or the patient should relocate until the patient is no longer infectious. (See appendix F.)

b. Discharge planning to home. Plans shall be initiated and in place prior to discharge. Discharge planning includes—

(1) A confirmed appointment with a provider who will follow through with the patient's care.

(2) Sufficient medication to take until the outpatient appointment. (See paragraph (1).)

(3) Referral to the MTF's CHN or local health department to ensure coordination of proper health services and requirements.

Section III
Cough-inducing Procedures

4-7. General guidelines

Procedures that involve instrumentation of the lower respiratory tract, or that induce cough, may increase the probability of droplet nuclei being expelled into the air. These cough-inducing procedures include endotracheal intubation and suctioning, diagnostic sputum induction, aerosol treatments, bronchoscopy and other procedures that may generate aerosols.

4-8. Patients with active TB or significant suspicion of having active TB

Patients with confirmed or suspected active TB shall be transported to an appropriate military or civilian MTF for any cough-inducing procedure.

Section IV
Decontamination

4-9. General

The mode of transmission for TB is airborne. Although microorganisms are ordinarily found on walls, floors and other environmental surfaces, these surfaces are rarely associated with transmission of infections to patients or health care workers. Equipment used on patients who have TB is usually not involved in the transmission of M. tuberculosis.

4-10. Disinfecting and sterilizing

a. Decontamination of an item will depend on the intended use of the item, not on the diagnosis of the patient for whom the item was used on.

b. Selection of disinfectant for cleaning, disinfecting or sterilizing of patient care items will depend on intended use, based on potential risk of infection and the structure and material of the item to be disinfected. Consult the Infection Control Policy and Procedure Guide for definitions and guidelines.

4-11. Environmental cleaning

a. Extraordinary attempts to disinfect or sterilize environmental surfaces are not indicated. The infection control approved quaternary disinfectant will be used.

b. The same routine daily cleaning procedures used in other rooms in the MTF will be used by housekeeping to clean the TB isolation room.

c. Housekeepers need not don the N-95 Respirator if the room has been ventilated for the appropriate amount of time. (Time varies according to the efficiency of the ventilation system used (for example, 6 air changes per hour = 69 minutes and 12 air changes per hour = 35 minutes.))

Chapter 5
The MEDDAC Staff

5-1. Education and training of the staff

a. All MEDDAC staff personnel shall be trained regarding the hazards and control of TB. The level and detail of training a staff member receives will vary according to his or her job responsibilities and the level of risk in the area he or she works in.

b. Training shall be provided as part of the MEDDAC's newcomers' orientation and CBAT. The need for additional training will be reevaluated annually by the ICP as part of the education component of the Infection Control Program.

c. During orientation to infection control at the unit level, the unit supervisor will educate the employee on unit-specific TB protocols.

d. The following topics will be addressed during newcomers' orientation training and CBAT IAW paragraph *a*, above:

(1) The basic concepts of TB transmission, pathogenesis, and diagnosis, including the difference between latent TB infection and active TB disease, the signs and symptoms of TB and the possibility of reinfection.

(2) The potential for occupational exposure to persons with infectious TB in the healthcare facility, including the prevalence of TB in the community and facility, the ability of the facility to appropriately isolate patients with active TB and situations with increased risk of exposure to TB.

(3) The principles and practices of infection control that reduce the risk of transmission of TB, including the hierarchy of TB infection control measures and the written policies and procedures of the facility.

(4) The purpose of PPD skin testing, the significance of a positive PPD test result, and the importance of participating in the skin testing program.

(5) The principles of preventive therapy for latent TB infection.

(6) The responsibility of staff members to promptly seek medical evaluation if symptoms develop that may be due to TB, or if a PPD test conversion occurs, in order to receive appropriate evaluation and therapy and to prevent transmission of TB to patients and other members of the staff.

(7) The principles of drug therapy for active TB.

(8) The importance of notifying OH and CHN of active cases of TB so appropriate contact investigation can be conducted.

(9) The responsibilities of the MTF to maintain the confidentiality of any staff member who has TB while ensuring he or she receives appropriate therapy and is non-infectious before

returning to duty.

(10) The higher risk posed by TB in individuals with HIV infection or other immune-compromising diseases or conditions.

e. Personnel who, as part of their normal duties, may need to provide care to patients in TB isolation shall receive the following additional training at the time of their initial and annual medical evaluation by OH:

(1) The reasons for the need to wear respirators and the risks of not doing so.

(2) The nature, extent, and specific hazards of TB transmission in the MTF.

(3) A description of specific risks of infection to each exposed individual.

(4) A description of why administrative and engineering controls may not be adequate to eliminate the need for personal respiratory protection.

f. Personnel who will be wearing N-95 respirators will receive the following training at the time of their initial fit testing:

(1) An explanation of the operation, capabilities and limitations of the respirator provided.

(2) Instruction on how to inspect, don, fit-check and correctly wear the respirator.

(3) An opportunity to handle, learn how to don, fit-check and correctly wear the respirator provided.

(4) Instruction on how to recognize a respirator that is functioning inadequately.

(5) An explanation of why a particular type of respirator has been selected, how to maintain and store it, and its limitations.

5-2. Respiratory protection

a. Personal respiratory protection is required for personnel whenever—

(1) Staff personnel enter a negative pressure isolation room occupied by a patient with suspected or confirmed infectious TB.

(2) Staff are present during performance of an emergency procedure on a patient with suspected or confirmed TB (that is, Code Blue).

(3) Ambulance personnel (or others) transport patients with suspected or confirmed active TB.

b. The Infection Control Committee shall determine which type(s) and brand(s) of respirator the MEDDAC will use to protect the staff. The chosen respiratory device(s) will comply with all regulating agency recommendations.

c. Annually, the Chief, PM and the Infection Control Committee will provide guidelines and recommendations to supervisors to enable them to determine which staff members require respiratory protection. (See appendix B.)

d. Department and service chiefs of the work areas listed in appendix B shall designate, by memorandum to the ICP, the employees with potential for exposure to TB as a requirement for their jobs. The number of workers and trainees potentially exposed and requiring a respirator should be limited.

e. OH will medically screen all active duty and federal civilian personnel in the Respiratory Protection Program and provide medical evaluation and clearance for respirator use. The evaluation will be performed for new employees at the time of inprocessing, when it is determined that they will have potential for TB exposure. Annual medical surveillance of respirator users will be accomplished in conjunction with OH birthmonth visit. Contractors will be screened by contract OH provider.

f. KACC uses the PAPR, which does not require fit testing. Staff shall be instructed on use and maintenance annually.

g. An MTF not using PAPR shall provide initial fit testing to all employees in the Respiratory Protection Program as required. (See appendix B.) Staff members shall be fitted with a respirator approved by the National Institute of Occupational Safety and Health, and instructed in its use and maintenance. The respirator shall be issued to the staff member at the time of fit testing and stored in a plastic bag, which will be identified with the employee's name. The useful life of the filter is as long as the respirator maintains its structural and functional integrity and the filter material is not physically damaged or soiled.

h. TB mask fit testing will be performed initially (before the employee is required to wear the respirator in the workplace) and must be repeated whenever respirator design or facial changes occur that could affect the proper fit of the respirator. Examples of conditions which would required additional fit testing of an employee include use of a different size or make of respirator, weight loss, cosmetic surgery, facial scarring, the installation of dentures or absence of dentures that are normally worn by the individual. (29 CFR 1910.139 (e) (5) (i))

i. If the health care provider does not have a respirator, the patient will remain on TB precautions (that is, will continue to wear a surgical mask).

5-3. Counseling staff members regarding TB

a. Notify OH if exposed to an active TB case.

b. All staff will be advised that annual skin testing is the minimum requirement for all personnel working in patient care areas.

c. All staff will be advised that if symptoms suggestive of TB are evident, the staff member should contact OH.

d. All staff members—

(1) Who know that they are immunocompromised should provide that information to OH so they may receive appropriate counseling.

(2) Who may be at risk for HIV infection should know their HIV status so that they may receive counseling from OH, if necessary.

(3) May voluntarily obtain HIV counseling and testing via OH.

e. Immunosuppressed staff shall be counseled to—

(1) Have appropriate follow up and screening for infectious diseases, to include TB, by their medical practitioners.

(2) Have PPD every six months if exposed to MTB, because of the high risk for rapid progression to active TB if infection occurs.

(3) Be tested for cutaneous anergy at the time of PPD testing (every six months).

(4) Be assured that information provided by staff members regarding their immune status shall be treated confidentially.

5-4. Screening for active TB infection

OH will screen the staff for active TB and will—

a. Promptly coordinate with the primary care manager (PCM) for evaluation of any staff member who exhibits a productive, prolonged cough ($\geq$ 3 weeks duration), especially in the presence of other symptoms or signs compatible with TB, such as weight loss, night sweats, bloody sputum, anorexia or fever.

b. Approve return to work only after active TB diagnosis is excluded or the staff member is undergoing therapy and is documented to be noninfectious.

5-5. Screening for latent TB infection

OH will screen the staff for latent TB infection as follows:

a. Administer a Mantoux PPD to all employees, including those with a history of vaccination with Bacillus of Calmette and Guerin (BCG), at the time of inprocessing unless a previously significant reaction can be documented. (Tine testing is not an acceptable method for screening.)

b. Persons age 35 years or older who have not had a documented negative PPD within the last five years will require a second PPD (two step PPD) if the first test is less than 10 millimeters (mm). This criteria rather than the CDC criteria requiring two step testing for all personnel without a documented negative PPD within the last 12 months, was chosen for baseline testing of permanent party military personnel because military personnel have repeated TB testing throughout their career although documentation is not always available. The criteria was also adopted for periodic testing because boosting usually occurs at an older age and no personnel are expected to go without testing for more than five years.

c. Ensure there is documentation of a negative chest x-ray after documented positive PPD.

d. During birth month, notify of, and provide, annual TB skin testing for all staff members who have negative TB skin tests and who work in patient care areas. Offer the test to all other personnel.

e. During birth month, employees who have a documented history of a positive PPD test will be screened by OH for signs or symptoms suggestive of TB, and documented in OH records.

f. Perform PPD testing IAW current CDC guidelines.

g. Evaluate PPD conversions to determine if there is evidence of transmission in the work area. If so, repeat every three months until no additional conversions have been detected for two consecutive 3-month periods in any area of the MTF.

h. Record employee PPD test results in a retrievable aggregate database so that data can be periodically analyzed to estimate the risk of acquiring new infection in each area or work group of the MTF.

5-6. Evaluation and management of staff members and other individuals with positive PPD tests

a. Evaluate significant TB reactions. (OH responsibility.)

(1) Evaluate all personnel entitled to care under the provisions of AR 40-3 and AR 40-5. Students, contractors, and volunteers not otherwise entitled to care must obtain evaluation from other sources at their own expense.

(2) Order chest x-rays and evaluate personnel who exhibit a significant reaction to the Mantoux test to determine the presence of current TB disease and/or tuberculin derived antigens.

(3) Obtain a history of possible exposure if an individual's PPD test converts to positive, in an attempt to determine the source. The drug susceptibility pattern of the MTB of known source patients should be determined in order to determine appropriate preventive therapy for the staff member with the PPD test conversion.

(4) Exclude a staff member from the workplace if symptoms compatible with TB are present, until a diagnosis of active TB is—

(a) Ruled out.

(b) Established and the staff member is being treated and is no longer infectious.

(5) Counsel staff members who have a TB infection, who cannot take or do not accept or complete a full course of preventive therapy, that they will not be excluded from work, but that they maintain a higher risk of developing active TB. These individuals should be further counseled to seek evaluation promptly if symptoms develop that may be due to TB, especially if they have been exposed to patients at high risk for developing TB, such as patients who are HIV infected.

b. Provision or referral for preventive treatment of reactors/converters. (CHN responsibility.)

(1) Evaluate all TB skin test reactors/converters who are entitled to care.

(2) Refer civilian employees who are not military health care beneficiaries to the PCM or public health department in their county of residence for evaluation and, if necessary, for treatment .

(3) Monitor INH Chemoprophylaxis IAW the CHN INH SOP.

(4) Refer eligible personnel back to OH after completion of INH treatment.

(5) Advise OH that staff members receiving preventive treatment for latent TB infection shall be allowed to continue their usual work activities.

c. Follow up of TB positive personnel. (OH responsibility.)

(1) Order chest radiographs for staff members with positive PPD tests as part of the initial evaluation of their PPD test. (Repeat chest radiographs are not needed unless symptoms develop that may be due to TB; this applies whether or not the staff member has completed a course of INH.)

(2) Evaluate personnel at higher risk of developing TB for the necessity of work restrictions.

(3) Annually, counsel personnel at high risk of developing TB regarding the risk of developing active TB and the need to seek prompt evaluation if symptoms develop.

d. Apply appropriate work restrictions for staff members with active TB. (OH/CHN responsibility.)

(1) Exclude staff members with pulmonary or laryngeal TB from work until they are no longer infectious.

(2) Ensure proof of receiving adequate therapy (for example, three consecutive daily negative sputum acid-fast bacilli (AFB) smears, and cough resolution before returning to work).

(3) Monthly, after work duties are resumed and while the staff member remains on anti-TB therapy, the staff member shall provide proof to CHN that he/she—

(a) Has maintained effective drug therapy for the appropriate time period.

(b) Is AFB sputum smear negative.

(c) Continues to be free of cough.

(4) Staff members with TB at sites other than the lung or larynx usually do not need to be excluded from work if concurrent pulmonary TB has been excluded and provided they are well enough to perform required duties.

(5) Exclude from work all staff members with TB who discontinue treatment before the recommended course of therapy has been completed until—

(a) Treatment is resumed.

(b) Adequate response to therapy is documented.

(c) Negative sputum smears on three consecutive days has been confirmed.

(6) Maintain confidentiality of the TB diagnosis, verify the appropriateness of the treatment, and monitor symptoms and job duties.

5-7. Epidemiologic investigation of potential TB transmission

a. Investigation of PPD conversions and active TB.

(1) Investigate PPD conversions of staff members IAW the protocol in appendix C.

(2) Evaluate the patient or staff member for active TB after skin test conversion is identified. Initiate referrals if necessary. (CHN responsibility.)

(3) Obtain a history of possible exposure in an attempt to determine the source. When the source of infection is known, the drug-susceptibility pattern of the MTB isolate from the source will be identified in order to determine appropriate preventive therapy. (CHN responsibility.)

(4) Administer PPD tests to close contacts and workers in the same area or group who may have had similar exposure to determine if there is evidence of additional transmission. The contact investigation will extend to possibly exposed patients, if such is indicated. (CHN/OH responsibility.)

(5) Initiate epidemiologic investigation, if indicated, by collaboration of PM sections (CHN, OH, IH and ICP). If a problem is identified regarding timely identification, TB isolation practices, or engineering controls, the PM will recommend appropriate interventions.

(6) Ensure that affected MTF staff follow the high risk category guidelines in that area if no specific problem can be identified. (See appendix B.) (ICP responsibility.)

(7) If transmission of TB appears to be occurring in the TB isolation room, recommend improved engineering controls. (IH responsibility.)

(8) Take the following steps if a staff member develops active TB: (CHN/OH responsibility.)

(a) Perform contact investigation that includes other staff members, patients and visitors who have had significant exposure to the staff member.

(b) Consult with CHN immediately to initiate investigation of community contacts; for example not exposed in the healthcare facility.

b. Investigation of possible patient-to-staff and or patient-to-patient transmission of TB.

(1) Conduct surveillance of active TB cases in patients. If surveillance suggests the possibility of patient-to-patient transmission (for example, if a high proportion of TB patients had prior admission in the past year, or a patient is identified with drug-resistant TB, or multiple patients have identical and characteristic drug-susceptibility, CHN/OH will—

(a) Review staff PPD test and patient surveillance data for the suspected areas to detect additional patients or staff with PPD conversions or active TB.

(b) Investigate the possibility of exposures of new TB patients to other patients with TB during prior visits to the MTF (that is, received the same procedure or were in same treatment area on the same day).)

(2) When transmission has occurred, CHN, OH, IH and the ICP will collaborate to—

(a) Conduct a problem evaluation to determine possible causes of the transmission, such as problems with patient detection, institutional barriers to implementation of appropriate TB isolation practices, or engineering controls.

(b) Determine which additional patients or staff members may have been exposed, and evaluate them with PPD tests.

(c) Consult with the public health department for assistance in community contact investigation.

(3) Investigate contacts of persons with TB who were not recognized and isolated appropriately. When a patient is seen in the MTF without being recognized as having TB and not

promptly isolated but is subsequently diagnosed as having infectious TB, the following will be done collaboratively by CHN, OH, and the ICP:

(a) The ICP will investigate to determine if TB was recognized in the patient in a timely manner or, if recognized, why the patient was not isolated promptly so that appropriate protective actions could have been taken.

(b) Identification by CHN and OH of staff members and other patients who were exposed to the patient will be accomplished by reviewing the patient's medical record to determine which areas and persons may have been exposed to the patient prior to appropriate isolation, and by interviewing staff and patients, as appropriate.

(c) Conduct a contact investigation, following a concentric circle, expanding from closest to less close contacts, if transmission to the former is found.

(4) Contact investigations.

(a) Identification and testing of TB contacts will be accomplished as a collaborative effort of OH, CHN and the ICP.

(b) Direction of the investigation will depend on the status of the index case, as follows:

1 If the index case is an outpatient, CHN will identify the contacts and coordinate with the ICP and OH.

2 If the index case is a staff member, OH will identify the contacts and coordinate with CHN and the ICP.

(c) A PPD skin test will be given to each person who was exposed and previously had a non-significant reaction to the skin test. (An increased induration of $\geq$ 5mm will be interpreted as a significant reaction.)

(d) If the initial test is negative, the skin test will be repeated 12 weeks after the exposure ended.

(e) All exposed persons with a significant reaction or for symptoms suggestive of TB, will be given chest x-rays (PA and LAT).

(f) Persons with previously known positive PPD reactions who have been exposed will be exempt from requiring a repeat skin test or chest x-ray unless they are symptomatic for TB. However, a chest x-ray should be ordered for such persons if they are identified as close contacts.

5-8. Coordination with PM and the state public health agency

a. Physicians will report suspected and diagnosed TB cases to PM to facilitate reporting to the state public health agency, and to assure appropriate community contact investigation, follow up and continuation of therapy.

b. Immunization Clinic and OH personnel will report new skin test positive persons to CHN.

c. CHN shall implement or coordinate home-based discharge plans involving the patient, staff members and appropriate civilian health departments. Home care issues to be addressed include—

(1) Implementation of directly-observed therapy and or educating the patient regarding proper compliance with the medication regimen.

(2) Ensuring that health care workers entering the patient's home wear a TB respirator until the patient is confirmed as non-infectious. If feasible, have the patient open windows prior to the visit.

(3) Teaching the patient the proper use and disposal of tissues for coughing and sneezing.

(4) Ensuring that immunocompromised persons or young children living in the home are

temporarily relocated, if possible, until the patient is no longer infectious.

(5) Instructing the patient to remain at home until the infectious stage has ended.

d. Confidentiality of staff members shall be maintained, This is prescribed by federal, state and local laws.

e. Contact investigations of patients and staff members with active TB shall be coordinated collaboratively by OH, CHN, and the ICP.

f. The Chief, PM shall provide assistance to outlying clinics to plan and implement their TB control programs, TB screening, outbreak investigations, and engineering expert referral.

Chapter 6
Additional Considerations for Selected Areas, and Candidates for Preventive Therapy

6-1. Additional considerations for selected areas

a. *Operating rooms*. Elective procedures on patients with active TB shall be delayed until the patient is no longer infectious. If surgery cannot be delayed, the patient should be hospitalized at an MTF that meets TB isolation ventilation requirements.

b. *Laboratories*. Laboratories processing specimens for mycobacterial studies; that is, AFB smears and cultures, shall conform to criteria specified by CDC and NIH (53-CDC/NIH 1993).

c. *Dental clinics*.

(1) During initial medical history and periodic updates, dental staff should routinely ask patients about a history of TB and symptoms suggestive of TB.

(2) Patients with a history and or symptoms suggestive of active TB will be promptly referred for evaluation.

(3) If a patient is suspected of having active TB, elective dental treatment will be delayed until it is confirmed that the patient does not have active TB. If the patient does have active TB, elective dental treatment will be deferred until the patient is no longer infectious.

(4) If emergency dental care must be provided for a patient who has or is strongly suspected of having active TB, the patient will be referred to a dental facility where TB isolation can be implemented.

(5) Dental personnel will be included in the PPD testing program.

6-2. Preventive therapy

Preventive chemoprophylaxis will be provided by PM and CHN IAW internal SOP.

Appendix A
References

Section I
Required Publications

AR 40-3
Medical, Dental, and Veterinary Care. (Cited in para 5-6.)

AR 40-5
Preventive Medicine. (Cited in para 5-6.)

AR 40-66
Medical Record Administration. (Cited in para 2-6.)

MEDDAC Infection Control Policy and Procedure Guide. (Cited in para 4-10.)

Section II
Related Publications

A related publication is merely a source of additional information. The reader does not have to read it to understand this regulation.

AMAC (JCAHO)
Accreditation Manual for Ambulatory Care, Joint Commission on Accreditation of Healthcare Organizations.

AR 310-25
Dictionary of United States Army Terms (Short Title: AD)

AR 310-50
Authorized Abbreviations, Brevity Codes, and Acronyms

CDC
Core Curriculum on Tuberculosis, Fourth Edition, 2000

CDC MMWR 43/RR13
Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health-Care Facilities, 28 Oct 94

CDC MMWR, 39/RR17
Guidelines for Preventing the Transmission of Tuberculosis in Health-Care Settings with Special Focus on HIV-related Issues, 7 Dec 90

Maryland Department of Health and Mental Hygiene
Guidelines for Prevention of Tuberculosis, March 1996

MEDDAC Reg 40-23
Authorized Local Medical Abbreviations

NIOSH
Recommended Guidelines for Personal Respiratory Protection of Workers in Health-Care Facilities Potentially Exposed to Tuberculosis, 14 Sep 92

Occupational Safety and Health Act of 1970
General Duty Provision of Section 5

OSHA, Enforcement Policy and Procedure for Occupational Exposure to Tuberculosis
USDL: 93-448, 20 Oct 93

OSHA Memorandum: Update on TB Respirators
OSHA Enforcement Policy for Occupational Exposure to Tuberculosis, 6 Sep 95

OSHA TB Compliance Directive (Instruction CPL 2.106) 9 Feb 96

29 CFR 1910.137
Respiratory Protection Standard

Section III
Prescribed Forms

This section contains no entries.

Section IV
Referenced Forms

This section contains no entries.

Appendix B
MEDDAC Employees Requiring Respiratory Protective Devices for TB Exposure

B-1. General

a. Personnel who work in the work areas listed para B-2 below, who are in the job classifications listed in paragraph B-3 and determined to be at risk, will be enrolled in the TB Respiratory Protection Program. These personnel are involved in the initial assessment, diagnostic evaluation and transfer of patients in the ambulatory care setting and may be at increased risk for exposure to TB.

b. Preventive Medicine Service will evaluate personnel, other than listed in paragraph B-2, upon request, on a case by case basis.

B-2. Work areas

a. Emergency Medical Services (when transporting potential TB patients).
b. Negative Pressure Isolation Room.

B-3. Military job classifications working in areas listed above

a. 61F Internist
b. 61H Family physician
c. 62A Emergency physician
d. 66H Medical-surgical nurse
e. 66J Clinical nurse
f. 91B Medical NCO
g. 91C Practical nurse
h. 91P X-ray specialist
i. 91V Respiratory therapy technician

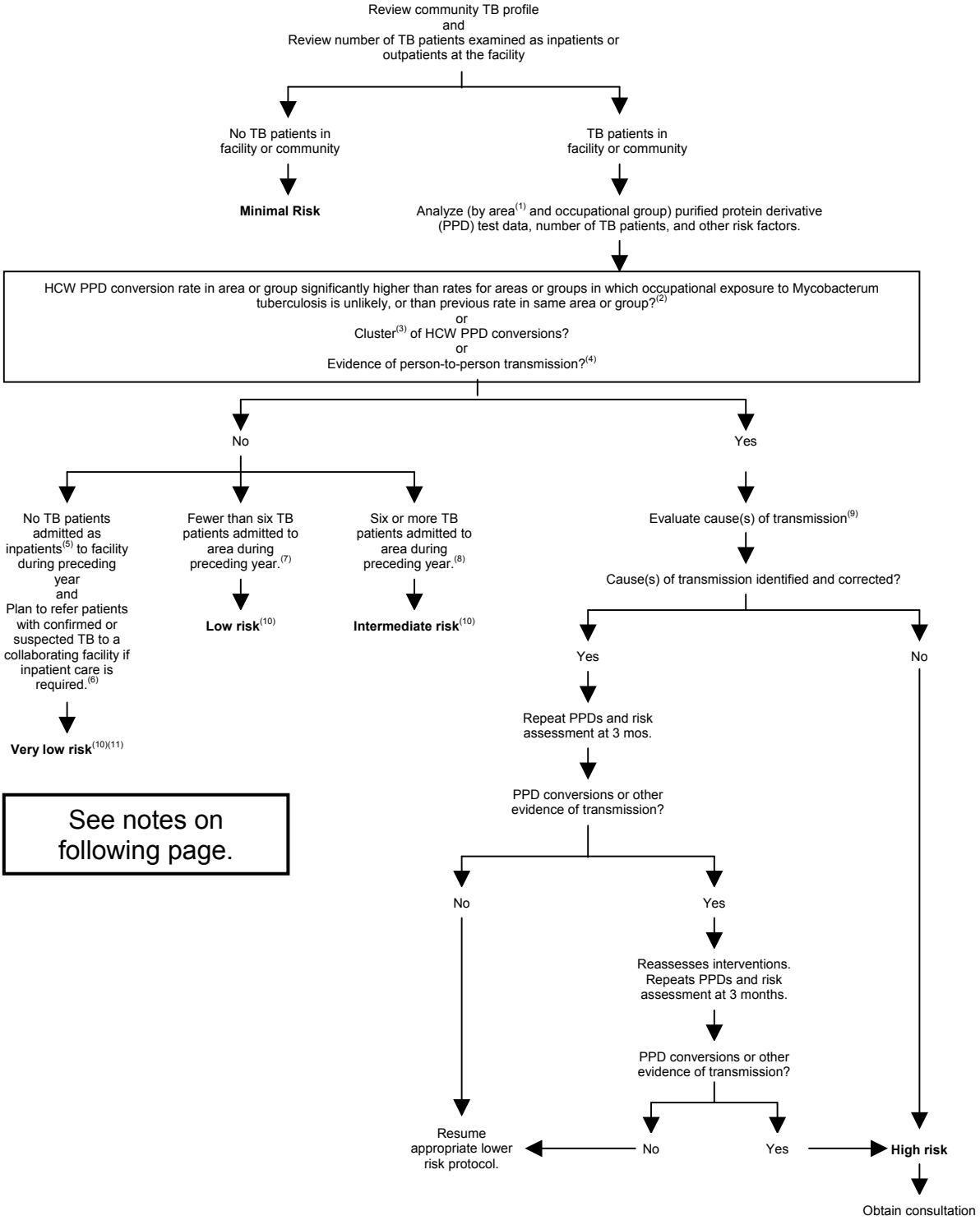
B-4. Civilian job classifications working in areas listed above

a. 602 Medical officer/consultant
b. 610 Registered nurse
c. 620 Practical nurse
d. 621 Nursing assistant
e. 640 Emergency medical technician
f. 647 X-ray technician
g. 651 Respiratory therapist

B-5. Revisions of this appendix

The Chief, PM and the ICP, working with department chiefs, will revise and update this appendix during annual reviews of the TBECP, or sooner if changes are needed.

Appendix C
Protocols for Conducting a TB Risk Assessment in a Healthcare Facility



(See notes to appendix C on next page.)

Notes for appendix C:

(1) Area: A structural unit (for example, a hospital ward or laboratory) or a functional unit (for example, an internal medicine service) in which HCWs provide services to and share air with a specific patient population or work with clinical specimens that may contain viable M. tuberculosis organisms. The risk for exposure to *M. tuberculosis* in a given area depends on the prevalence of TB in the population served and the characteristics of the environment.

(2) With epidemiologic evaluation suggestive of occupational (nosocomial) transmission. (See Problem Evaluation section in *Guidelines for Preventing Mycobacterium tuberculosis in Health-Care Facilities, 1994*, CDC.)

(3) Cluster: Two or more PPD skin test conversions occurring within a 3-month period among HCWs in a specific area or occupational group, and epidemiologic evidence suggests occupational (nosocomial) transmission.

(4) For example, clusters of M. tuberculosis isolates with identical DNA fingerprint (RFLP) patters or drug-resistance patterns, with epidemiologic evaluation suggestive of nosocomial transmission. (See Problem Evaluation section in *Guidelines for Preventing Mycobacterium tuberculosis in Health-Care Facilities, 1994*, CDC.)

(5) Does not include patients identified in triage system and referred to a collaborating facility or patients being managed in outpatient areas.

(6) To prevent inappropriate management and potential loss to follow up of patients identified in the triage system of a very low risk facility as having suspected TB, an agreement should exist for referral between the referring and receiving facilities.

(7) Or, for occupational groups, exposure to fewer than six TB patients for HCWs in the particular occupational group during the preceding year.

(8) Or, for occupational groups, exposure to six or more TB patients for HCWs in the par-ticular occupational group during the preceding year.

(9) See Problem Evaluation section in *Guidelines for Preventing Mycobacterium tuberculosis in Health-Care Facilities, 1994*, CDC.

(10) Occurrence of drug-resistant TB in the facility or community, or a relatively high prevalence of HIV infection among patients or HCWs in the area, may warrant a higher risk rating.

(11) For outpatient facilities, if TB cases have been documented in the community but no TB patients have been examined in the outpatient area during the preceding year, the area can be designated as very low risk.

Excerpted from *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-care Facilities, 1994*, CDC.

Appendix D
TB Risk Categories

Minimal Risk	The "minimal risk" category applies only to an entire facility. A minimum risk facility does not admit TB patients to inpatient or outpatient areas and is not located in a community with TB; i.e., counties or communities in which TB cases have not been reported during the previous year. Thus there is essentially no risk for exposure to TB patients in the facility. This category may also apply to many outpatient settings; e.g., many medical and dental offices.
Very Low Risk	The "very low risk" category generally applies only to an entire facility. A very low risk facility is one in which a) patients with active TB are not admitted to inpatient areas but may receive initial assessment and diagnostic evaluation or outpatient management in outpatient areas; e.g., ambulatory care and emergency departments, and b) patients who may have active TB and need inpatient care are promptly referred to a collaborating facility. In such facilities, the outpatient areas in which exposure to patients with active TB could occur should be assessed and assigned to the appropriate low, intermediate, or high risk category. Categorical assignment will depend on the number of TB patients examined in the area during the preceding year and whether there is evidence of nosocomial transmission of M. tuberculosis in the area. If TB cases have been reported in the community but no patients with active TGB have been examined in the outpatient area during the preceding year, the area can be designated as very low risk; e.g., many medical offices.
Low Risk	"Low risk" areas or occupational groups are those in which a) the PPD test conversion rate is not greater than that for areas or groups in which occupational exposure to M. tuberculosis is unlikely or than previous conversion rates for the same area or group, b) no clusters* of PPD test conversions have occurred, c) person-to-person transmission of M. tuberculosis has not been detected, and d) fewer than six TB patients are examined or treated per year.
Intermediate Risk	"Intermediate risk" areas or occupational groups are those in which a) the PPD test conversion rate is not greater than that for areas or groups in which occupational exposure to M. tuberculosis is unlikely or than previous conversion rates for the same area or group, b) no clusters* of PPD test conversions have occurred, c) person-to-person transmission of M. tuberculosis has not been detected, and d) six or more patients with active TB are examined or treated each year. Survey data suggests that facilities in which six or more TB patients are examined or treated each year may have an increased risk for transmission of M. tuberculosis (CDC, unpublished data); thus, areas in which six or more patients with active TB are examined or treated each year (or occupational groups in which healthcare workers are likely to be exposed to six or more TB patients per year) should be classified as "intermediate risk."
High Risk	"High risk" areas or occupational groups are those in which a) the PPD test conversion rate is significantly greater than for areas or groups in which occupational exposure to M. tuberculosis is unlikely or than previous conversion rates for the same area or group, and epidemiologic evaluation suggest nosocomial transmission; **or** b) a cluster* of PPD test conversions has occurred, and epidemiologic evaluation suggests nosocomial transmission of M. tuberculosis ; **or** c) possible person-to-person transmission of M. tuberculosis has been detected.

* Clusters. Two or more PPD skin test conversions occurring with a 3-month period among healthcare workers in a specific area or occupational group, and epidemiologic evidence suggests occupational (nosocomial) transmission.

Excerpted from *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-care Facilities, 1994*, CDC.

Appendix E
Elements of a TB Infection Control Program

Element	Risk categories				
	Minimal	Very Low	Low	Intermediate	High
Assigning responsibility (Section II.A)					
Designated TB control officer or committee	R	R	R	R	R
Conducting a risk assessment (Section II.B.1)					
Baseline risk assessment	R	R	R	R	R
Community TB profile; incidence, prevalence, and drug-susceptibility patterns	Y	Y	Y	Y	Y
Facility case surveillance (laboratory- and discharge-diagnosis-based)	C	C	C	C	C
Analysis of purified protein derivative (PPD) test results among healthcare workers (HCWs)	N/A	V[1]	Y	every 6-12 mos	every 3 mos
Review of TB patient medical records	N/A	O[2]	Y	every 6-12 mos	every 3 mos
Observation of infection control practices	N/A	N/A	Y	every 6-12 mos	every 3 mos
Evaluation of engineering control maintenance	O[3]	O[3]	Y	every 6-12 mos	every 3 mos
Developing a TB infection control plan (Section II.B.2)					
Written TB infection control plan	R	R	R	R	R
Periodically reassessing risk (Section II.B.3)					
Reassessment of risk	Y	Y	Y	every 6-12 mos	every 3 mos
Identifying, evaluating, and initiating treatment for patients who may have active TB (Section II.C)					
Protocol (clinical prediction rules)[4] for identifying patients who may have active TB	R	R	R	R	R
Protocol for diagnostic evaluation of patients who may have active TB[5]	N/A	R	R	R	R
Protocol for reporting laboratory results to clinicians, infection control practitioners, collaborating referral facilities, and appropriate health department(s)	N/A	R	R	R	R
Protocol for initiating treatment of patients who may have active TB[5]	N/A	R	R	R	R
Managing patients who may have TB in ambulatory care settings and emergency departments (Section II.D)					
Triage system for identifying patients who have active TB in emergency departments and ambulatory care settings	R	R	R	R	R
Protocol for managing patients who may have active TB in emergency departments and ambulatory care settings	R	R	R	R	R
Protocol for referring patients who may have active TB to collaborating facility	R	R	N/A[6]	N/A[6]	N/A[6]
Managing hospitalized patients who may have TB (Section II.E)					
Appropriate number of TB isolation rooms[7]	N/A	N/A	R	R	R
Protocol for initiating TB isolation	N/A	N/A	R	R	R
Protocol for TB isolation practices	N/A	N/A	R	R	R
Protocol for discontinuing TB isolation	N/A	N/A	R	R	R
Protocol for discharge planning	N/A	N/A	R	R	R
Engineering controls (Supplement 3, Section II.F)					
Protocol(s) for maintenance of engineering controls	O[3]	O[3]	R	R	R
Respiratory protection (Supplement 4, Section II.G)					
Respiratory protection program	N/A	V[1]	R	R	R
Cough-inducing and aerosol-generating procedures (Section II.H)					
Protocol(s) for producing cough-inducing or aerosol-generating procedures	O	O[8]	R	R	R
Engineering controls for performing cough-inducing or aerosol-generating procedures	O[3]	O[8]	R	R	R
Educating and training HCWs (Section II.I)					
Educating and training HCWs regarding TB	R	R	R	R	R

R = Recommended; Y = Yearly; C = Continual; N/A = Not applicable; O = Optional; and V = Variable.

(Continued on next page.)

Element	Minimal	Very Low	Low	Intermediate	High
Counseling and Screening HCWs (Section II.J)					
Counseling HCWs regarding TB	R	R	R	R	R
Protocol for identifying and evaluating HCWs who have signs or symptoms of active TB	R O[9]	R R	R R	R R	R R
Baseline PPD testing of HCWs					
Routine periodic PPD screening of HCWs for latent TB infection	N/A	V[1]	Y	every 6-12 mos	every 3 mos
Protocol for evaluating and managing HCWs who have positive PPD tests	R	R	R	R	R
Protocol for managing HCWs who have active TB	R	R	R	R	R
Conducting a problem evaluation (Section II.K)					
Protocol for investigating PPD conversions and active TB in HCWs	R	R	R	R	R
Protocol for investigating possible patient-to-patient transmission of Mycobacterium tuberculosis	R	R	R	R	R
Protocol for investigating possible contacts of TB patients who were not diagnosed initially as having TB and were not placed in isolation	R	R	R	R	R
Coordination with the public health department (Section II.L)					
Effective system for reporting patients who have suspected or confirmed TB to appropriate health department(s)	R	R	R	R	R

R = Recommended; Y = Yearly; C = Continual; N/A = Not applicable; O = Optional; V = Variable.

Notes:

(1) Since very low risk facilities do not admit patients who may have active TB to inpatient areas, most HCWs in such facilities do not need routine follow up PPD screening after baseline PPD testing is done. However, those who are involved in the initial assessment and diagnostic evaluation of patients in the ambulatory care, emergency, and admitting departments of such facilities or in the outpatient management of patients with active TB could be exposed potentially to a patient who has active TB. These HCWs may need to received routine periodic PPD screening. Similarly, these HCWs may need to be included in a respiratory protection program.

(2) Since very low risk facilities do not admit patients suspected of having active TB, review of TB patient medical records is not applicable. However, follow up of patients who were identified during triage as possibly having TB and referred to another institution for further evaluation and management may be useful in evaluating the effectiveness of the triage system.

(3) Some minimal or very low risk facilities may elect to use engineering controls (such as booths for cough-inducing procedures, portable high-efficiency particulate (HEPA) filtration units, ultraviolet germicidal irradiation units) in triage and waiting areas. In such situations, appropriate protocols for maintaining this equipment should be in place, and this maintenance should be evaluated periodically.

(4) The criteria used in clinical prediction rules will probably vary from facility to facility depending on the prevalence of TB in the population served by the facility and on the clinical, radiologic, and laboratory characteristics of TB patients examined in the facility.

(5) The protocols should be consistent with CDC/American Thoracic Society recommendations (33).

(6) Protocols for referring patients who require specialized treatment (such as patients with multi-drug resistant TB) may be appropriate.

(7) Based on maximum daily number of patients requiring TB isolation for suspected or confirmed active TB. Isolation rooms should meet the performance criteria specified in these guidelines.

(8) If such procedures are used in the triage protocol(s) for identifying patients who may have active TB.

(9) Minimal risk facilities do not need to maintain an ongoing PPD skin testing program. However, baseline PPD testing on HCWs may be advisable so that if an unexpected exposure does occur, conversions can be distinguished from positive PPD test results caused by previous exposures.

Excerpted from *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-care Facilities, 1994*, CDC.

Appendix F
Persons at Higher Risk for TB Exposure or Infection *

F-1. Persons at higher risk for TB exposure or infection

a. Close contacts of persons known or suspected to have TB, such as those sharing the same household or other enclosed environments).

b. Foreign-born persons, including children, from areas that have a high incidence or prevalence of TB,such as Asia, Africa, Latin America, Eastern Europe, and Russia).

c. Residents and employees of high-risk congregate settings, such as correctional institutions, nursing homes, mental institutions, other long-term residential facilities, and shelters for the homeless.

d. Health care workers who serve high-risk clients.

e. Some medically underserved, low-income populations as defined locally.

f. High-risk racial or ethnic minority populations, defined locally as having an increased prevalence of TB, such as Asians and Pacific Islanders, Hispanics, African Americans, Native Americans, migrant farm workers, and homeless persons.

g. Infants, children, and adolescents exposed to adults in high-risk categories.

h. Persons who inject illicit drugs; any other locally identified high-risk substance users, such as crack cocaine users.

F-2. Persons at higher risk for TB disease once infected

a. Persons with HIV infection.

b. Persons who were recently infected with *M. tuberculosis* (within the past 2 years), particularly infants and very young children.

c. Persons who have medical conditions known to increase the risk for disease if infection occurs, such as diabetes and the end stage renal disease.

d. Persons who inject illicit drugs; other groups of high-risk substance users, such as crack cocaine users.

e. Persons with a history of inadequately treated TB.

* Adapted from the Core Curriculum on Tuberculosis

Appendix G
Tuberculin Skin Testing (Application and Interpretation)

G-1. Purified Protein Derivative (PPD)

PPD is a precipitate obtained from filtrates of old tuberculin. It is always the test of choice in diagnosing delayed hypersensitivity in persons infected with Mycobacterium Tuberculosis.

G-2. Administration of the PPD (Mantoux) test

a. The Mantoux test is performed by the intradermal injection of 0.1 mm of PPD tuberculin containing 5 TU (tuberculin units) into either the volar or dorsal surface of the forearm. The injection should be made with a disposable tuberculin syringe just beneath the surface of the skin, with the needle bevel facing upward to produce a discrete, pale elevation of the skin (a wheal) 6 mm to 10 mm in diameter.

b. To prevent needlestick injuries, needles should not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, disposable needles and syringes should be placed in puncture-resistant containers for disposal. Gloves are not necessary for this procedure.

c. The Mantoux test should be read 48 to 72 hours after the injection; however, if the patient fails to show up for the scheduled reading, positive reactions may still be measurable up to 1 week after testing. The reading should be based on measurement of induration, not erythema. The diameter of induration should be measured transversely to the long axis of the forearm and recorded in millimeters.

G-3. Interpretation and recording of PPD

a. An induration of 0 mm to 4 mm is classified as "negative."

b. An induration of 5 mm or more is classified as "positive" in the following groups:

(1) Persons who have had close recent contact with a patient with infectious TB.

(2) Persons who have chest x-rays with fibrotic lesions likely to represent old healed TB.

(3) Persons with known or suspected HIV infection.

c. An induration of 10 mm or more is classified as "positive" in persons who do not meet the above criteria but who have other risk factors for TB. These would include:

(1) Persons with other medical risk factors known to substantially increase the risk of TB once infection has occurred.

(2) Foreign-born persons from high prevalence countries, such as those from Asia, Africa, and Latin America.

(3) Medically underserved, low-income populations, including high risk minorities, especially Blacks, Hispanics, and Native Americans.

(4) Intravenous (IV) drug users.

(5) Residents of long-term care facilities, such as correctional institutions and nursing homes.

(6) Other populations which have been identified locally as having an increased prevalence of TB.

d. An induration of 15 mm or more is classified as "positive" in all other persons.

e. In no case will the designation "negative"or "positive" be recorded alone. Millimeters of induration will always be recorded.

f. The tuberculin skin test results will be documented on the SF 601 (Health Record-Immunization Record) and on HHS Form PHS 731 (International Certificates of Vaccination).

g. Refer all individuals with PPD results $\geq$5 mm to the Community Health Section for evaluation and follow up.

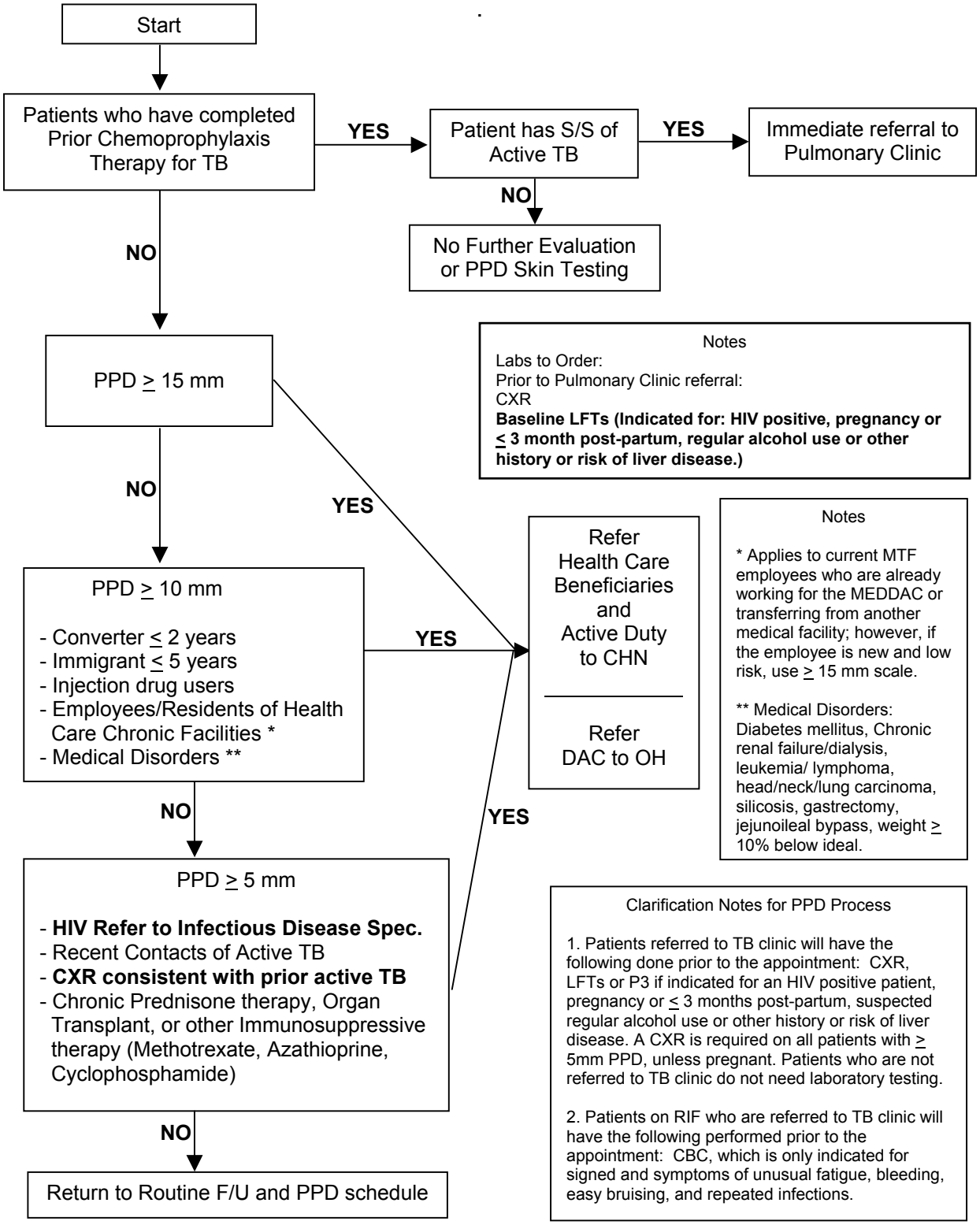
G-4. Skin test sensitivity and immunity to TB after Bacille Calmette-Guerin (BCG) vaccine

Skin test sensitivity and immunity to TB after BCG vaccine are highly variable, and there is no reliable method for distinguishing tuberculin reactions caused by BCG from those caused by natural infections. Since the incidence of TB is high in countries with BCG vaccination programs, a positive skin test for tuberculosis should be evaluated independently of BCG history.

G-5. Tuberculin Tine Test or Monovac

In exceptional circumstances, this type of test may be used for mass screening or in contact investigations for very large numbers of people. Reactions of 2 mm or more induration at the site of puncture normally will be confirmed with an intermediate PPD. If the Monovac/Tine test vesiculates, it is considered a "positive" tuberculin skin reaction and is not confirmed by PPD. Reactions of less than 2 mm usually are not palpable and are read as "negative." These tests will be read between 48 to 72 hours. All test results will be recorded in mm of induration.

Appendix H
Abnormal Adult Purified Protein Derivative (PPD) Referral Protocol



Glossary

Section I
Abbreviations

API
airborne precaution isolation

CBAT
computer-based annual training

CDC
Centers for Disease Control and Prevention

CFR
Code of Federal Regulations

CHN
Community Health Nursing Section

CONUS
continental United States

COR
contract officer representative

CIC
civilian in charge

DENTAC
U.S. Army Dental Activity, Fort George G. Meade

DOT
directly observed therapy

EH
environmental health

HCW
health care worker

HEPA
high efficiency particulate air

HIV
human immunodeficiency virus

IAW
in accordance with

ICP
infection control practitioner

IH
industrial hygiene

INH
isoniazid

JCAHO
Joint Commission on Accreditation of Healthcare Organizations

KACC
Kimbrough Ambulatory Care Center

MEDDAC
U.S. Army Medical Department Activity, Fort George G. Meade

MTB
Mycobacterium tuberculosis

MTF
medical treatment facility

NCOIC
noncommissioned officer in charge

NIOSH
National Institute of Occupational Safety and Health

OCONUS
outside continental United States

OH
occupational health; occupational health clinic

OSHA
Occupational Safety and Health Administration

PAPR
powered air filtration respirator

PCM
primary care manager

PM
preventive medicine service

PPD
purified protein derivative

PPE
personal protective equipment

RPD
respirator protective device

SOP
standing operating procedure

TB
tuberculosis

TBECP
Tuberculosis Exposure Control Plan

USDL
United States Department of Labor

UVGI
ultraviolet germicidal irradiation

Section II
Terms

Acid-fast bacilli (AFB)
Bacteria that retain certain dyes after being washed in an acid solution. Most acid-fast organisms are mycobacteria. When AFB are seen on a stained smear of sputum or other clinical specimen, a diagnosis of TB should be suspected; however, the diagnosis of TB is not confirmed until a culture is grown and identified as M. tuberculosis.

Adherence
Refers to the behavior of patients when they follow all aspects of the treatment regimen as prescribed by the medical provider, and also refers to the behavior of HCWs and employers when they follow all guidelines pertaining to infection control.

Aerosol
The droplet nuclei that are expelled by an infectious person (that is, by coughing or sneezing). These droplet nuclei can remain suspended in the air and can transmit M. tuberculosis to other persons.

Airborne precautions
Infection control measures designed to reduce the risk of airborne transmission of infectious agents by private room placement that has monitored negative pressure, 6 to 12 air changes per hour, and discharge of air outdoors.

Air changes
The ratio of the volume of air flowing through a space in a certain period of time (the airflow rate) to the volume of that space (the room volume). This ratio is usually expressed as the number of air changes per hour.

Alveoli
The small air sacs in the lungs that lie at the end of the bronchial tree; the site where carbon dioxide in the blood is replaced by oxygen from the lungs and where TB infection usually begins.

Anergy
The inability of a person to react to skin-test antigens (even if the person is infected with the organisms tested) because of immunosuppression.

Area
A structural unit, such as a hospital ward or laboratory, or a functional unit, such as an internal medicine service, in which health care workers provide services to and share air with a specific patient population or work with clinical specimens that may contain viable M. tuberculosis organisms. The risk for exposure to M. tuberculosis in a given area depends on the prevalence of TB in the population served and the characteristics of the environment.

Asymptomatic
Without symptoms, or producing no symptoms.

Bacillus of Calmette and Guerin (BCG) vaccine
A TB vaccine used in many parts of the world.

Booster phenomenon
A phenomenon in which some people (especially older adults) who are skin tested many years after infection with M. tuberculosis have a negative reaction to an initial skin test, followed by a positive reaction to a subsequent skin test. The second (positive) reaction is caused by a boosted immune response. Two step testing is used to distinguish new infections from boosted reactions. (See Two-step testing.)

Bronchoscopy
A procedure for examining the respiratory tract that requires inserting an instrument (a bronchoscope) through the mouth or nose and into the trachea. The procedure can be used to obtain diagnostic specimens.

Cavity
A hole in the lung resulting from the destruction of pulmonary tissue by TB or other pulmonary infections or conditions. TB patients who have cavities in their lungs are referred to as having cavitary disease, and they are often more infectious than TB patients without cavitory disease.

Chemotherapy
Treatment of an infection or disease by means of oral or injectable drugs.

Cluster
Two or more PPD skin-test conversions occurring within a 3-month period among health care workers in a specific area or occupational group, and epidemiologic evidence suggests occupational (nosocomial) transmission.

Contact
A person who has shared the same air with a person who has infectious TB for a sufficient amount of time to allow possible transmission of M. tuberculosis.

Conversion, PPD
See PPD test conversion.

Culture
The process of growing bacteria in the laboratory so that organisms can be identified.

Directly observed therapy
An adherence-enhancing strategy in which a HCW or other designated person watches the patient swallow each dose of medication.

Droplet nuclei
Microscopic particles (1 to 5 microns in diameter) produced when a person coughs, sneezes, shouts, or sings. The droplets produced by an infectious TB patient can carry tubercle bacilli and can remain suspended in the air for prolonged periods of time and be carried on normal air currents in the room.

Drug resistance, acquired
A resistance to one or more anti-TB drugs that develops while a patient is receiving therapy and which usually results from the patient's nonadherance to therapy or the prescription of an inadequate regimen by a health care provider.

Drug resistance, primary
A resistance to one or more anti-TB drugs that exists before a patient is treated with the drug(s). Primary resistance occurs in persons exposed to and infected with a drug-resistant strain of M. tuberculosis.

Drug-susceptibility pattern
The anti-TB drugs to which the tubercle bacilli cultured from a TB patient are susceptible or resistant based on drug-susceptibility tests.

Drug-susceptibility tests
Laboratory tests that determine whether tubercle bacilli cultured from a patient are susceptible or resistant to various anti-TB drugs.

Employee
Both active duty personnel and DA civilian personnel unless otherwise stated.

Ethambutol
A first-line, oral, anti-TB drug sometimes used concomitantly with INH, rifampin, and pyrazinamide.

Exposure
The condition of being subjected to something (that is, an infectious agent or agents) that could have a harmful effect. A person exposed to M. tuberculosis does not necessarily become infected. (See Transmission).

First-line drugs
The most often used anti-TB drugs (INH, rifampin, pyrazinamide, ethambutol, and streptomycin).

Fomites
Linens, books, dishes, or other objects used or touched by a patient. These objects are not involved in the transmission of M. tuberculosis.

Hierarchy of control measures
Use of administrative measures to reduce the risk of exposure

to persons with infectious TB; use of engineering controls to prevent the spread and reduce the concentration of infectious droplet nuclei; and use of personal respiratory protective equipment.

High-efficiency particulate air (HEPA) filter
A specialized filter that is capable of removing 99.97% of particles > 0.3 mm in diameter and that may assist in controlling the transmission of M. tuberculosis. Filters may be used in ventilation systems to remove particles from the air or in personal respirators to filter air before it is inhaled by the person wearing the respirator. The use of HEPA filters in ventilation systems requires expertise in installation and maintenance.

Human immunodeficiency virus (HIV) infection
Infection with the virus that causes acquired immunodeficiency syndrome (AIDS). HIV infection is the most important risk factor for the progression of latent TB infection to active TB.

Immunosuppressed
A condition in which the immune system is not functioning normally (that is, there is severe cellular immunosuppression resulting from HIV infection or immunosuppressive therapy. Immunosuppressed persons are at greatly increased risk for developing active TB after they have been infected with M. tuberculosis. No data is available regarding whether these persons are also at increased risk for infection with M. tuberculosis after they have been exposed to the organism.

Induration
An area of swelling produced by an immune response to an antigen. In tuberculin skin testing or anergy testing, the diameter of the indurated area is measured 48-72 hours after the injection, and the result is recorded in millimeters.

Infection
The condition in which organisms capable of causing disease (M. tuberculosis) enter the body and elicit a response from the host's immune defenses. TB infection may or may not lead to clinical disease.

Infectious
Capable of transmitting infection. When persons why have clinically active pulmonary or laryngeal TB disease cough or sneeze, they can expel droplets containing M. tuberculosis into the air. Persons whose sputum smears are positive for AFB are probably infectious.

Injectable
A medication that is usually administered by injection into the muscle (intramuscular (IM) or the blood-stream intravenous (IV)).

Intermittent therapy
Therapy administered either two or three times per week, rather than daily. Intermittent therapy should be administered only under the direct supervision of a HCW or other designated person. (See Directly observed therapy.)

Intradermal
Within the layers of the skin.

Isoniazid (INH)
A first-line, oral drug used either alone as preventive therapy or in combination with several other drugs to treat TB disease.

Latent TB infection
Infection with M. tuberculosis, usually detected by a positive PPD skin-test, in a person who has no symptoms of active TB and who is not infectious.

Mantoux test
A method of skin testing that is performed by injecting o.ml of PPD-tuberculin containing 5 tuberculin units into the dermis (the second layer of skin of the forearm with a needle and syringe). This test is the most reliable and standardized technique for tuberculin testing. (See Tuberculin skin test and Purified protein derivative (PPD)-tuberculin test.)

Multidrug-resistant tuberculosis (MDR-TB)
Active TB caused by M. tuberculosis organisms that are resistant to more than one anti-TB drug; in practice, often refers to organisms that are resistant to both INH and rifampin with or without resistance to other drugs. (See Drug resistance, acquired and Drug resistance, primary.)

Negative pressure
The relative air pressure difference between two areas in a healthcare facility. A room that is at negative pressure has a lower pressure than adjacent areas, which keeps air from flowing out of the room and into adjacent rooms or areas.

Nosocomial
An occurrence, usually an infection, that is acquired in a hospital or as a result of medical care.

Portable room-air HEPA recirculation units
Free-standing portable devices that remove airborne contaminants by recirculating air through a HEPA filter.

Positive PPD reaction
A reaction to the purified protein derivative (PPD)-tuberculin skin test that suggests the person tested is infected with M. tuberculosis. The person interpreting the skin-test reaction determines whether it is positive on the basis of the size of the induration and the medical history and risk factors of the person being tested.

Preventive therapy
Treatment of latent TB infection used to prevent the progression of latent infection to clinically active disease.

Purified-protein derivative (PPD) - tuberculin
A purified tuberculin preparation that was developed in the 1930s and that was derived from old tuberculin. The standard Mantoux test uses 0.1 ml of standardized to 5 tuberculin units.

Purified protein derivative (PPD) - tuberculin test
A method used to evaluate the likelihood that a person is infected with M. tuberculosis. A small dose of tuberculin (PPD) is injected just beneath the surface of the skin, and the area is examined 48-72 hours after the injection. A reaction is measured according to the size of the induration. The classification of a reaction as positive or negative depends on the patient's medical history and various risk factors. (See Mantoux test.)

Purified protein derivative (PPD) - tuberculin test conversion
A change in PPD test results from negative to positive. A conversion within a 2-year period is usually interpreted as new M. tuberculosis infection, which carries an increased risk for progression to active disease. A booster reaction may be misinterpreted as a new infection. (See Booster phenomenon and two step testing.)

Pyrazinamide
A first-line, oral anti-TB drug used in treatment regimens.

Radiography
A method of viewing the respiratory system by using radiation to transmit an image of the respiratory system to film. A chest radiograph is taken to view the respiratory system of a person who is being evaluated for pulmonary TB. Abnormalities, such as lesions or cavities in the lungs and enlarged lymph nodes, may indicate the presence of TB.

Recirculation
Ventilation in which all or most of the air that is exhausted from an area is returned to the same area or other areas of the facility.

Regimen
Any particular TB treatment plan that specifies which drugs are used, in what doses, according to what schedule, and for how long.

Registry
A record-keeping method for collecting clinical, laboratory, and radiographic data concerning TB patients so that the data

can be organized and made available for epidemiologic study.

Resistance
The ability of some strains of bacteria, including M. tuberculosis, to grow and multiply in the presence of certain drugs that ordinarily kill them; such strains are referred to as drug-resistant strains.

Rifampin
A first-line, oral anti-TB drug that, when used concomitantly with INH and pyrazinamide, provides the basis for short-course therapy.

Room-air HEPA recirculation systems and units
Devices (either fixed or portable) that remove airborne contaminants by recirculating air through a HEPA filter.

Second-line drugs
Anti-TB drugs used when the first-line drugs cannot be used (for drug-resistant TB or because of adverse reactions to the first-line drugs). Examples are cycloserine, ethionamide, and capreomycin.

Smear (AFB smear)
A laboratory technique for visualizing mycobacteria. The specimen is smeared onto a slide and stained, then examined using a microscope. Smear results should be available within 24 hours. In TB, a large number of mycobacteria seen on an AFB smear usually indicates infectiousness. However, a positive result is not diagnostic of TB because organisms other than M. tuberculosis may be seen on an AFB smear (non-tuberculous mycobacteria.

Source case
A case of TB in an infectious person who has transmitted M. tuberculosis to another person or persons.

Source control
Controlling a contaminant at the source of its generation, which prevents the spread of the contaminant to the general work space.

Specimen
Any body fluid, secretion, or tissue sent to a laboratory where smears and cultures for M. tuberculosis will be performed (sputum, urine, spinal fluid, and material obtained at biopsy).

Sputum
Phlegm coughed up from deep within the lungs. If a patient has pulmonary disease, an examination of the sputum by smear and culture can be helpful in evaluating the organism responsible for the infection. Sputum should not be confused with saliva or nasal secretions.

Sputum induction
A method used to obtain sputum from a patient who is unable to cough up a specimen spontaneously. The patient inhales a saline mist, which stimulates a cough from deep within the lungs.

Sputum smear, positive
AFB are visible on the sputum smear when viewed under a microscope. Persons with a sputum smear positive for AFB are considered more infectious than those with smear-negative sputum.

Streptomycin
A first-line, injectable anti-TB drug.

Symptomatic
Having symptoms that may indicate the presence of TB or another disease. (See Asymptomatic.)

TB case
A particular episode of clinically active TB. This term should be used only to refer to the disease itself, not the patient with the disease. By law, cases of TB must be reported to the local health department.

TB infection
A condition in which living tubercle bacilli are present in the body but the disease is not clinically active. Infected persons usually have positive tuberculin reactions, but they have no symptoms related to the infection and are not infectious. However, infected per-

sons remain at lifelong risk for developing disease unless preventive therapy is give.

Transmission
The spread of an infectious agent from one person to another. The likelihood of transmission is directly related to the duration and intensity of exposure to M. tuberculosis. (See Exposure.)

Treatment failures
TB disease in patients who do not respond to chemotherapy and in patients whose disease worsens after having improved initially.

Tubercle bacilli
M. tuberculosis organisms.

Tuberculin skin test
A method used to evaluate the likelihood that a person is infected with M. tuberculosis. A small dose of PPD-tuberculin is injected just beneath the surface of the skin, and the area is examined 48-72 hours after the injection. A reaction is measured according to the size of the induration. The classification of a reaction as positive or negative depends on the patient's medical history and various risk factors. (See Mantoux test, PPD test.)

Tuberculosis (TB)
A clinically active, symptomatic disease caused by an organism in the M. tuberculosis complex (usually M. tuberculosis or rarely, M. bovis or M. africanum).

Two-step testing
A procedure used for the baseline testing of persons who will periodically receive tuberculin skin tests (that is, HCWs, to reduce the likelihood of mistaking a boosted reaction for a new infection). If the initial tuberculin-test result is classified as negative, a second test is repeated 1-3 weeks later. If the reaction to the second test is positive, it probably represents a boosted reaction. If the second test result is also negative, the person is classified as not infected. A positive reaction to a subsequent test would indicate new infection (a skin-test conversion in such a person).

Ventilation, dilution
An engineering control technique to dilute and remove airborne contaminants by the flow of air into and out of an area. Air that contains droplet nuclei is removed and replaced by contaminant-free air. If the flow is sufficient, droplet nuclei become dispersed, and their concentration in the air is diminished.

Virulence
The degree of pathogenicity of a microorganism as indicated by the severity of the disease produced and its ability to invade the tissues of a host. M. tuberculosis is a virulent organism.